

Front smoothly rounded between the eyes, meeting the vertex in the same plane but with a distinct ridge between; vertex slightly depressed. Pronotum finely and indistinctly striated transversely, about sixteen striations across the middle line, these being more distinct posteriorly. Fore wings finely rugose and finely pubescent, the hairs scarcely visible except in microscope mounts; the veins on the clavus distinct; a dark stigma filling the first apical cell and extending a little basally from this and preceded by a narrow longitudinal pale area which lies just away from the anterior margin of the wing; the third apical cell not triangular (as in *C. delicata*, Ball): the first discoidal cell much smaller than the second. Spines on the hind tibiae very stout. Genitalia as in fig. 2.

*Habits*.—The eggs were not found, but all evidence points to their being laid in the tissue of the flower-stalk.

The nymphs are pale whitish-brown and are found usually one to three, but occasionally more, together in the froth masses on the flower-stalks of cacao. The froth of this species, although very watery, is strongly calcareous, and often dries externally to a chalky mass, which may persist on the tree for a long time after the adults have emerged.

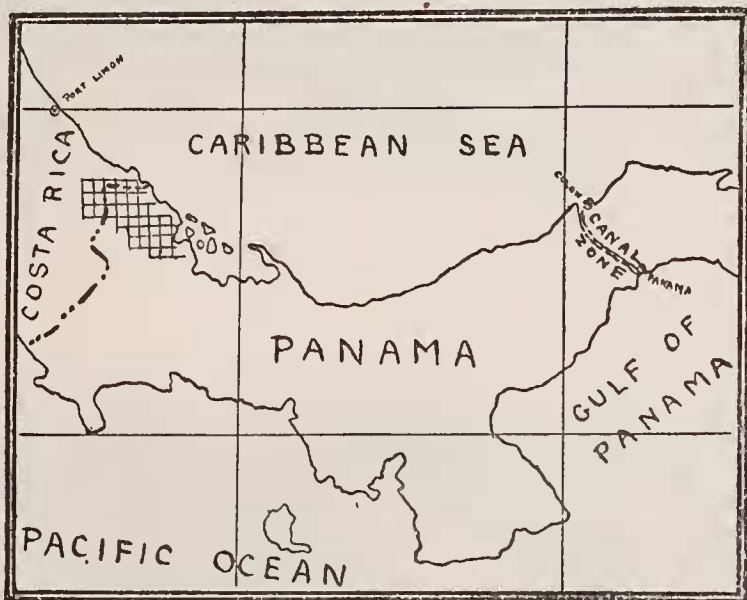


Fig. 3. Sketch map showing distribution of the Cacao Froghopper in Costa Rica and Panama.

The adults were extremely difficult to find in the field, and beating and sweeping trees heavily infested with nymphs only produced two adults. Many were, however, obtained by breeding.

*Parasites*.—The froth frequently contained one or two white elongate larvae of a species of *Drosophila*, and the brown seed-like puparia of this fly were also found. The question as to whether these were parasites or inquilines has already been discussed.

From a number of froth-masses put into a parasite box several small parasitic Hymenoptera emerged, but a later search revealed one of the same species inside a *Drosophila* pupa, so they were parasites of these and not of the *Clastoptera*.

*Food-plants*.—The insect was, with one exception, only found on the cultivated cacao, *Theobroma cacao*. The one exception was the finding of the doubtful remains of froth-masses on the flower-stalks of a wild tree in the forest, which bore deeply ridged cacao-like pods on the trunk and was obviously closely related to the cacao.

This is a very strong indication that the insect is native to the district and has gone to the cultivated cacao from the related wild species.

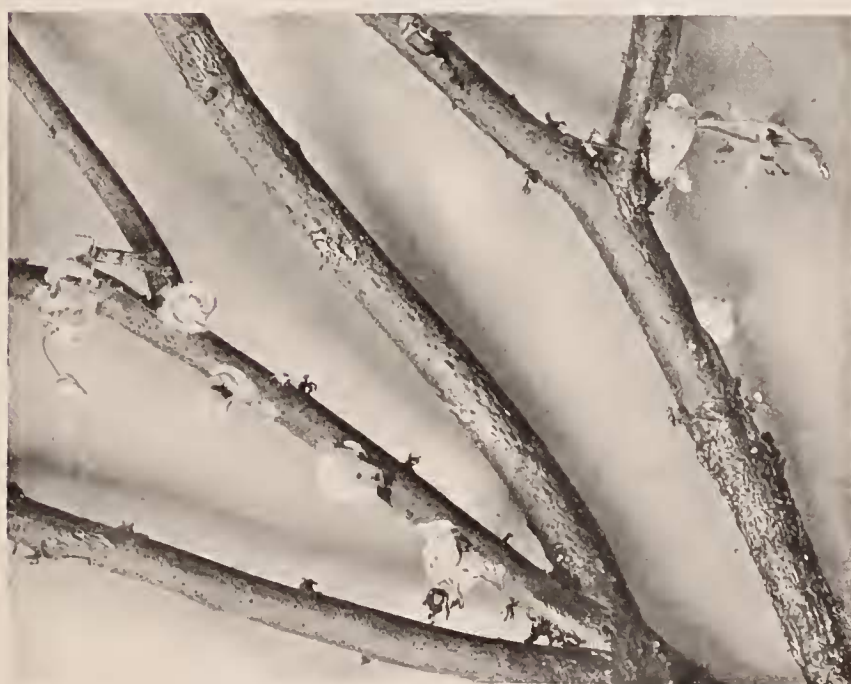
*Distribution* (fig. 3).—The insect was found in the following localities, which are all on or near the Atlantic coast on the border of the Panama Republic and Costa Rica, in the area shaded on the map :—

PANAMA REPUBLIC : Province of Bocas del Toro :—Chiquito, near Guabito, 20.vi.1917 ; Changuinola, ii.-v.1917 ; near Almirante, 7.vi.1917. COSTA RICA : Talamanca Province :—Suretka, 4.iii.1917.

In addition to the above, Mr. J. B. Rorer, then Mycologist to the Department of Agriculture of Trinidad, reported to me that he had seen similar froth-masses on the flower-stalks of cultivated cacao at Machala, Province of El Oro (Pacific Coast), Ecuador, in December 1918, but no specimens were obtained for examination.

In Panama the insect was only seriously abundant on a few acres near Changuinola, and its present status is that of a potential pest which should be carefully watched in case conditions should become suitable for its rapid multiplication and spread.

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Froth-masses of *Clastoptera theobromae*, Williams, sp. n.,  
on flower-stalks of Cacao.





## NEW AND LITTLE-KNOWN MESOPOTAMIAN BLOOD-SUCKING DIPTERA (FAMILIES SIMULIIDAE AND TABANIDAE).

By Major E. E. AUSTEN, D.S.O.

With the exception of a short paper published some two and a half years ago by Major Patton, which, however, deals only with TABANIDAE,\* little or nothing has hitherto appeared in print on the subject of Mesopotamian representatives of the two families mentioned in the title of the present contribution. It is therefore hoped that the following notes, however incomplete, may be of some slight assistance to collectors of blood-sucking flies who may be stationed in Mesopotamia, and may at the same time stimulate them to further efforts.

The bulk of the material described or mentioned in the following pages was collected either by Major A. D. Fraser, D.S.O., M.C., R.A.M.C. ; Major J. E. M. Boyd, M.C., R.A.M.C. ; or Mr. P. A. Buxton ; but all specimens available to the writer for examination have been noticed.

The whole of the material in question, including types of new species, is in the British Museum (Natural History).

### Family SIMULIIDAE.

#### Genus *Simulium*, Latreille.

#### *Simulium bipunctatum*, sp. n. (fig. 1).

♀.—Length (11 specimens), 1.75 to just under 2 mm.

*Ground colour of head and thorax olive-grey† or deep olive-grey ; head, dorsum of thorax and entire surface of abdomen clothed with closely set, appressed, shining, silvery or yellowish-silvery hairs, making a light background with which a pair of deep black bare spots (shallow circular depressions) on dorsum of thorax close to its anterior margin forms a sharp contrast ; legs cinnamon-buff or ochraceous-buff, front tarsi (except extreme base of first segment) and tips of hind tibiae blackish brown, tips of middle and hind tarsi and also those of front and middle tibiae, at least on extensor surfaces, dark brown or brownish, hind femora incompletely banded with brown shortly before their distal extremities.*

*Head : front in ♀ rather broad (measured on margin of vertex about as broad as long), but narrowing rapidly from above downwards ; palpi, blackish brown, sparsely clothed with pale hairs ; antennae, dark brown, second and two following segments ochraceous-tawny, dark brown portion clothed with microscopic, appressed, yellowish hairs. Thorax : dorsum when denuded or partially denuded exhibiting an incomplete, impressed, lyrate mark, similar to that seen on thorax of *S. equinum*, L., ♀, and consisting of a narrow, median, longitudinal straight line, and a curved arm, somewhat broader posteriorly and not in contact with median line either behind or in front, on each side ; median line of lyrate mark, when completely developed, extending from anterior margin of thorax to pre-scutellar depression ; lateral arms, which are sometimes brownish olive posteriorly, terminating abruptly behind, a little in front of level of costal border of wings, and anteriorly each ending in inner margin of corresponding black spots ; scutellum fringed posteriorly and laterally with relatively*

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\* Cf. Patton, "Some Notes on the Arthropods of Medical and Veterinary Importance in Mesopotamia, and on their Relation to Disease.—Part I. The Gad Flies of Mesopotamia": Ind. Journ. Med. Res., Calcutta, vii, no. 4, pp. 735–750, pl. lxvii, text-figs. 1 and 2, April 1920.

† For names and illustrations of colours used for descriptive purposes in the present paper, see Ridgway, "Color Standards and Color Nomenclature" (Washington, D.C. Published by the Author, 1912).

long and fine, erect, whitish hair. *Abdomen*: fringe of hair on first tergite (abdominal scale) whitish or silvery, fairly long at sides; ground-colour of abdomen (normally completely concealed by the hairy covering) similar to that of legs, second and at least two following tergites each with a large, blackish, median blotch. *Wings* normal. *Halteres* ivory-yellow or cream-buff. *Legs*: first segment of front tarsi not expanded, in length about equal to the three following segments taken together; first segment of hind tarsi not expanded, last four segments of hind tarsi together equal to about three-fifths of first segment in length, second segment only about one-fourth longer than third, but without any noticeable dorsal excision; all claws long and slender, in each case with a large tooth, about half the length of the claw, at the base; hairy covering of legs similar in coloration and character to that of body.

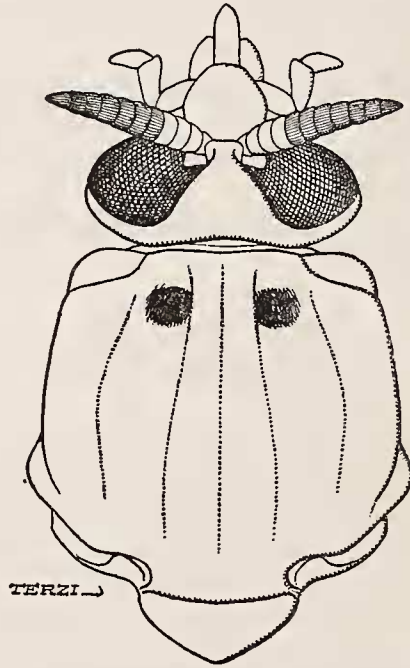


Fig. 1. Head and thorax of *Simulium bipunctatum*, Austen, ♀ (hairy covering omitted).

N.B.—Basal segment of antennae should be shaded.

Mesopotamia, precise locality unknown; additional specimens from Daurah, R. Tigris. Holotype and six paratypes, precise locality unknown, 1921 (*Major A. D. Fraser*); four other paratypes, Daurah (five miles below Baghdad), May–June, 1920, “fairly common soon after sunrise” (*Major A. D. Fraser*).

Although in size and general appearance the species just described is not unlike the Nilotic *S. griseicollis*, Becker, of Upper Egypt and the Egyptian Sudan, the remarkable thoracic spots (fig. 1) at once distinguish *Simulium bipunctatum*, at least in the female sex, not only from the species mentioned, but also, so far as the writer is aware, from any of its congeners at present known.\*

\* What would appear to be a variety or local race of *S. bipunctatum* occurring in Palestine is represented in the National Collection by a solitary ♀, which differs from the typical form in having the legs much more extensively infuscated; *inter alia* the front femora, except their extreme tips, are deep mouse-grey, the hind femora are broadly banded with dark brown before their distal extremities, and the front and hind tibiae, in addition to their dark tips, are each banded with dark brown just beyond the base. Apart from the details mentioned, there are no noticeable differences from the typical form. The type of this variety, which, in honour of its discoverer, may be termed *Simulium bipunctatum* var. *buxtoni*, var. n., was taken at Jericho, 1.i.1922 (*P. A. Buxton*), and subsequently presented to the British Museum by the Imperial Bureau of Entomology.

Family TABANIDAE.  
 Subfamily PANGONIINAE.  
 Genus **Silvius**, Meigen.

**Silvius irritans**, Ric. (fig. 2).

*Silvius irritans*, Ricardo, Ann. Mag. Nat. Hist. (7), viii, p. 292 (1901).

*Silvius unicolor*, Becker, Ann. Mus. Zool. Acad. Imp. Sc. St. Pétersb., xvii, p. 588 (1913). [New synonymy].

One ♀, Hit, R. Euphrates, vii.1920; one ♀, Ramadi, R. Euphrates, 9.viii.1920, "in horse lines"; a third ♀, Ramadi, ix.1920: all collected and presented by Major A. D. Fraser, who states in a field-note that the "eyes are golden-green, with dark brown markings" (fig. 2).

The typical series (seven ♀♀) of this species, which is in the British Museum, was taken in 1884-85 in Khorasan, Persia, and in the Hari-rud Valley, Afghanistan, by Dr. J. E. T. Aitchison, Naturalist of the Afghan Delimitation Commission, who writes (Trans. Linn. Soc., London (2) v, Zool., p. 132, 1889):—"Near Mount Do-Shakh my ponies were nearly driven mad with the numbers of this very small species; although in ones or twos they did not give much trouble, when in large numbers, as I saw them, they were extremely irritating to the cattle, chiefly attacking the head and fore legs."

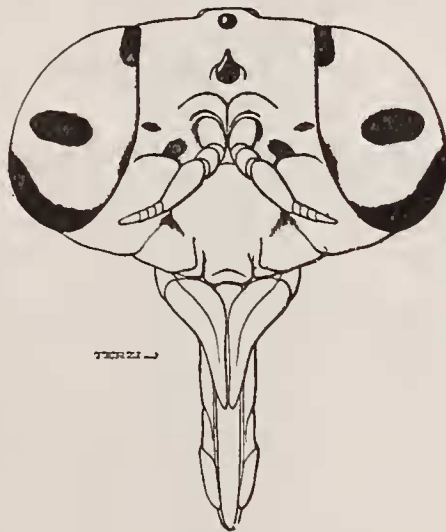


Fig. 2. Head of *Silvius irritans*, Ric., ♀, from in front, showing frontal callus, bare flecks or spots near base of antennae, and eye-markings.

In the case of the typical series of *S. irritans*, all the specimens belonging to which are denuded and shrivelled through having originally been preserved in alcohol, the ground-colour of the dorsum of the abdomen is pinkish cinnamon, with conspicuous slate-black markings as follows:—a large, rounded, median blotch on the second (visible) tergite, not extending to the hind margin, and deep transverse bands on the third and three or four following tergites, each band occupying the anterior three-fourths of the segment; in the case of the third (sometimes also in that of the fourth) tergite the band may be twice interrupted, so as to form a transverse series of three discontinuous blotches; certain specimens show an ill-defined, dusky, median blotch on the first (visible) tergite, projecting somewhat beyond the hind margin of the scutellum. Similar abdominal markings, largely concealed by the coat of pale olive-buff pollen with which head and body in this species are normally covered, are



exhibited by one of Major Fraser's specimens from Ramadi. In the other example from the same locality and in the ♀ from Hit the dorsum of the abdomen is practically unicolorous pinkish buff or light ochraceous-buff, though in the former specimen there is a trace of a dark blotch on each side of the anterior border of the fourth and two following tergites, while the specimen from Hit shows an ill-defined dusky median blotch on the second (visible) tergite. As regards dark leg-markings, the Mesopotamian specimens exhibit considerable reduction in comparison with those from Khorasan and Afghanistan; in particular the blackish-brown area at the distal extremities of the front tibiae is much less extensive, while the front tarsi, instead of being uniformly black or blackish brown, have the first segment blackish brown only at the tip, while the following three segments are more or less distinctly ochraceous-buff at the base. The first and second segments of the antennae are also less infuscated in the Mesopotamian examples than in those belonging to the typical series. While it is clear, however, that, in markings at any rate, *S. irritans* is subject to variation in different parts of its area, there can here be no question of specific difference, as is at once evident on examining the frontal callus and the four small bare flecks near the base of the antennae (fig. 2).

*Silvius unicolor*, Becker, the identity of which with *S. irritans*, Ric., leaves no room for doubt, would appear to represent a form of the species with unicolorous abdomen and femora marked with broad brown bands on their distal halves, or even more extensively infuscated. The four ♀♀ constituting the typical series of this variety were obtained in Persian Baluchistan.

#### Genus *Chrysops*, Meigen.

##### *Chrysops simillima*, sp. n. (fig. 3).

♀.—Length (two specimens), 7.75 to 8.6 mm.; width of head, 2.4 to 2.5 mm.; width of front at vertex, 0.8 to 1 mm.; length of wing, 6.5 to 7.4 mm.

*In ♀ sex, at any rate, very closely resembling C. punctifera*, Lw.; agreeing therewith in coloration of body and legs as well as in abdominal markings, but distinguishable by the wing-markings (fig. 3), in which, while they present a general agreement with those of the species mentioned, the proximal infuscation in the first basal cell is confined to the extreme base instead of occupying at least half the length of the cell. When examples of *C. simillima* are compared with Palestine specimens of *C. punctifera*, the hair on the dorsum of the thorax (including the scutellum) appears shorter and paler, while the front tibiae (viewed from the side) are more swollen; in a comparison with Algerian representatives of *C. punctifera*, however, these differences are less noticeable.

Head pale olive-buff pollinose, clothed with similarly coloured or pale yellowish hair, which is longer on basioccipital region; front in ♀ slightly broader at its lower extremity than at vertex; frontal callus shining black, transversely elongate, fusiform or elliptical oval with blunted ends, about twice as wide as its greatest depth, but widely separated from eye on each side; ocelli surrounded by a more or less sharply defined, blackish area; face with a pair of shining, sepia-coloured facial tubercles, each connected with lower margin of clypeus by usual narrower downward extension; jowls with a larger or smaller shining black area below (not in contact with) each eye; proximal segment of palpi neutral grey or smoke-grey, clothed with hair similar to that on adjacent region of head, distal segment cinnamon-buff or tawny-olive, moderately swollen proximally, then acuminate, clothed on outer side with short glistening, pale hairs; first segment of antennae ochraceous-tawny (sometimes brownish at distal extremity), elongate, straight and cylindrical, not swollen, clothed above with minute black hairs and below with pale hairs, second segment blackish brown (sometimes paler at base), about one-sixth shorter than first segment and with a similar hairy covering, third segment black, rather longer than first. Thorax: dorsum, including scutellum, light olive-grey pollinose, pleurae, pectus, and a broad lateral border on each side of scutum pale olive-buff pollinose, dorsum with a pair of broad,



semi-shining, admedian longitudinal stripes, extending in each case from a short distance behind upper extremity of humeral callus to inner angle of posterior extremity of postalar callus, dorsum of scutum also exhibiting a narrow, dusky, median longitudinal line, not reaching either front or hind margin; dorsum clothed (more thinly on dark stripes) with short, appressed, glistening, Naples-yellow hairs, pleurae clothed with longer, fine, silky, whitish hair. *Abdomen* warm buff, first and second segments paler (Naples yellow), dorsum with blackish-brown markings as shown in fig. 3, last three tergites mainly deep olive-buff pollinose; venter with last three segments, except hind borders, infuscated (deep olive), second (visible) and third sternites sometimes each with a narrow, deep mouse-grey, interrupted median longitudinal stripe, fourth sternite with a similarly coloured, more or less well-defined, median blotch resting on base but not reaching hind margin; abdomen clothed with short,

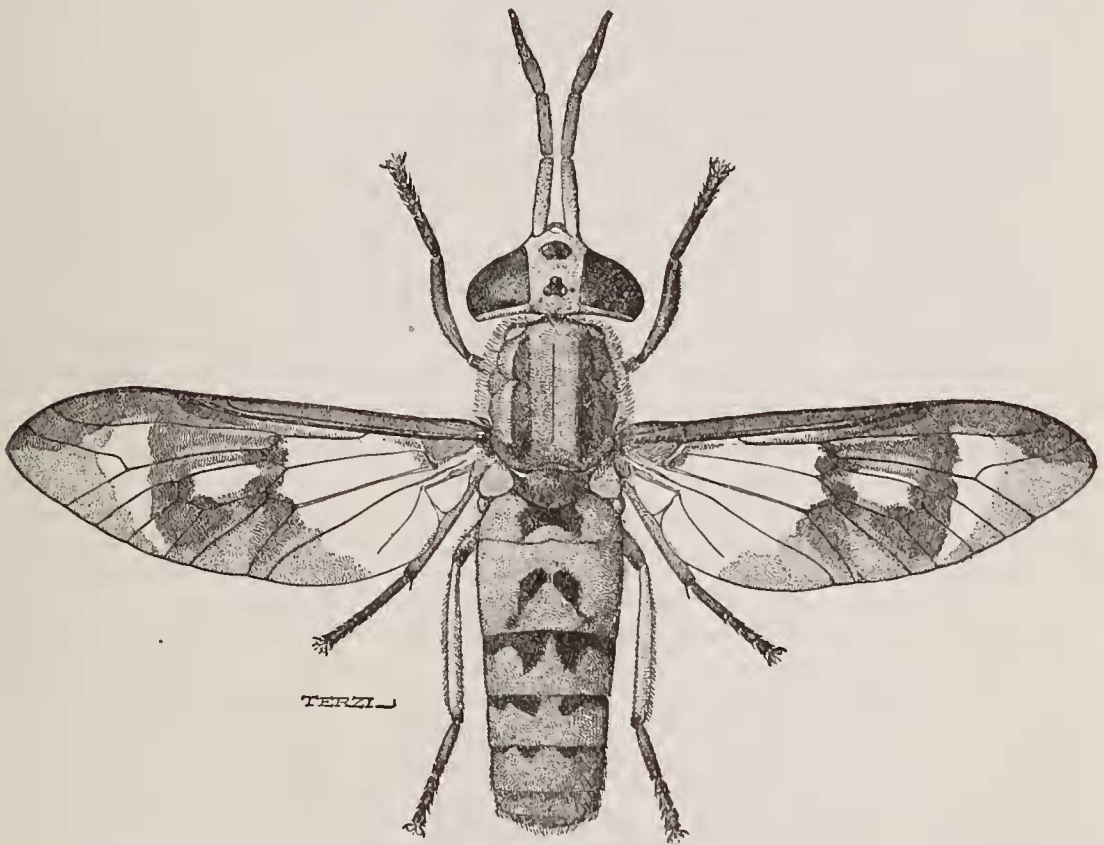


Fig. 3. *Chrysops simillima*, Austen, ♀.

appressed, glistening Naples-yellow hairs, dark markings on third and fourth tergites sometimes clothed mainly with minute black hairs. *Wings* with mummy-brown (in life perhaps blackish-brown) markings as shown in fig. 3, there being a large and well-defined clear "window-pane" in discal cell (in case of type and paratype, at any rate, communicating more or less distinctly with clear space in fifth posterior cell), and apical fleck (*Spitzenfleck* of German writers) being broader than costal border; infuscation at base of second basal cell less extensive than corresponding infuscation in wing of *C. punctifera*, Lw. (for infuscation at base of first basal cell see fig. 3, and diagnosis in italics above). *Squamae* pale pinkish-buff, their borders paler. *Halteres* seal-brown or clove-brown, stalks sepia-coloured. *Legs*: front coxae pinkish-buff, pale olive-buff pollinose on anterior surface, middle and hind coxae lighter or darker greyish pollinose, all coxae clothed with pale hair; trochanters blackish brown; femora ochraceous-tawny, clothed with pale (cream-buff) hair (extreme tips clothed,

at least in part, with minute black hairs), tips of femora blackish brown; tibiae cinnamon-buff, front pair distinctly swollen and their distal extremities (approximately distal halves) blackish brown, extreme bases of all tibiae and extreme tips of middle and hind pairs also blackish brown, paler area of front tibiae clothed on extensor surface and outside with appressed, glistening, ochreous hairs, infuscated area and inner surface of front tibiae clothed with minute black hairs, middle and hind tibiae clothed with cream-buff hair, their extreme tips clothed with minute black hairs; front tarsi uniformly black, middle and hind tarsi blackish brown, bases of second and third segments of middle and hind tarsi, as also first segments except their tips, cinnamon-buff; tarsi clothed with minute black hairs, upper surfaces of first segments of middle and hind pairs except their tips, and of extreme bases of second and third segments of middle and hind pairs clothed mainly with appressed, glistening, cream-buff hair.

Hawizeh Amara and Ramadi. Holotype, Hawizeh Amara, 18.vii.1918 (*P. A. Buxton*: presented by the Imperial Bureau of Entomology); paratype, Ramadi, R. Euphrates, August 1920 (*Major A. D. Fraser*).

Owing to the presence of a clear "window-pane" in the discal cell, the species described above belongs to Kröber's Group *Heterochrysops*,\* of which *C. punctifera*, Lw., is also a member. From a second representative of the same group, *C. beckeri*, Kröber (*loc. cit.*, p. 135, pl. ii, fig. 60), the type of which was obtained in Turkestan, the new species is distinguishable, *inter alia*, by the dark stripes on the dorsum of the thorax being somewhat dull, instead of shining black; by the narrowness of the dark brown costal border on the wings, this border being distinctly narrower than the apical fleck instead of being of equal breadth; by the first basal cell being infuscated (with a faint brownish smear) at the extreme base, as well as conspicuously at the tip, instead of having the latter alone brown; and by the front femora being clothed with black hairs only at the tips, instead of on the lower surface generally.

Finally, it may be noted that a solitary ♂ in the National Collection, 8 mm. in length, which is in all probability to be assigned to *Chrysops simillima*, while practically identical in outward appearance with the ♂ of *C. punctifera*, Lw., even when subjected to an extremely close scrutiny, is nevertheless distinguishable owing to the shape of the shining black facial tubercles. In the specimen referred to, the areas in question, which are larger than the corresponding areas in the case of *C. punctifera* ♂, have their lower margins horizontal (instead of running obliquely upwards and outwards), so that the angle formed with the outer margin in each case is to all intents and purposes a right angle. Besides the differences mentioned, the lateral spots on the second (visible) abdominal tergite, in addition to being Naples yellow or cream-coloured, and therefore paler than is usually the case in *C. punctifera* ♂, have their inward extensions narrower, though whether these features are constant it is at present, of course, impossible to say. The ♂ under discussion was taken at Tonooma (on left bank of Shatt el Arab), Basra area, 20–26.ii.1919 (*Captain P. J. Barraud*: presented by the Imperial Bureau of Entomology).

It only remains to add that the species described above is doubtless that which is referred to and described by Major Patton (*loc. cit.*, p. 741) as *Chrysops punctifera*, Lw.

#### Subfamily TABANINAE.

#### Genus *Tabanus*, Linnaeus.

#### *Tabanus arabicus*, Macq.

Two ♂♂, three ♀♀, Daurah, R. Tigris, five miles below Baghdad, 23–30.v.1920 (*Major A. D. Fraser*); one ♀, Kurna, R. Tigris, May 1918 (*P. A. Buxton*—presented by the Imperial Bureau of Entomology).

\* Cf. O. Kröber, "Die Chrysops-Arten der paläarktischen Region nebst den Arten der angrenzenden Gebiete": Zool. Jahrb., Abt. f. Syst., Geogr. u. Biol. der Tiere, xliii, pp. 42, 50 (1920).



The provenance of this species is given by Macquart simply as "Arabie." The foregoing specimens agree very well with the brief original description, and, so far as it is possible to judge without comparing them with the typical ♂ and ♀ mentioned by the author, there can be little doubt that they have been correctly determined.

The eyes are bare in both sexes, and in the case of the ♂ the area of enlarged facets, which, except posteriorly, occupies approximately the upper three-fourths, is sharply demarcated below; posteriorly the border of small facets diminishes progressively in width from below upwards, until, apart from distinctions caused by colour, it merges more or less imperceptibly into the larger facets (here greatly reduced in size) in the region of the vertical triangle. In the case of the ♀ the eyes are marked with three purple bands. The front in the same sex is of moderate width above and narrower below, and there are two dark brown or blackish-brown frontal calli, the lower of which is large and oval or oblong in shape, while the upper callus is a more or less linear prolongation from the lower. In both sexes the dorsum of the abdomen exhibits a dusky, median, longitudinal stripe, normally more or less concealed by a continuous series of pale-haired, olive-grey triangles. Between median stripe and lateral border on each side, and not in contact with either, is a longitudinal series of oblique, roughly elongate-ovate, pale-haired spots, those forming the respective pairs being situated on the first (visible) to the sixth tergites inclusive, and extending the full length of the segment in each case.

Macquart, at the end of his original description (Mém. Soc. roy. Sc. Agric. Arts Lille 1838, iii, p. 299, 1838), states that *T. arabicus* resembles *T. graccus*, Meig. (*sic*). If by *T. graccus*, "Meig.," the homonymous Fabrician species is intended, the comparison is unfortunate, since, apart from family and generic characters, there is no resemblance whatever between the two.

#### ***Tabanus fumidus*, sp. n. (figs. 4, 5).**

♀.—Length (three specimens), 11·6 to 14·8 mm.; width of head just over 4 to 5 mm.; width of front at vertex, 0·6 to 0·75 mm.; length of wing, 9·2 to 11 mm.

*Smallish, smoke-grey species, with two frontal calli in ♀ and bare eyes; front in ♀ of moderate width; dorsum of thorax unicolorous, with little or no trace of longitudinal stripes; dorsum of abdomen with darker markings, as shown in fig. 4; wings hyaline, with an appendix to anterior branch of third longitudinal vein.*

*Head*: front and subcallus smoke-grey pollinose, former clothed with minute cream-coloured hairs, which at sides of and above upper frontal callus are sometimes mixed with or even largely replaced by minute black hairs, no trace of an ocellar tubercle; a faint and ill-defined, sepia-coloured, horizontal band connecting base of each antenna with corresponding eye; face, jowls and occiput pallid neutral grey pollinose or whitish pollinose, the two former and basi-occipital region clothed with silvery-white hair, hind margin of occiput fringed above with short, whitish hairs; *front* in ♀ somewhat narrower below, about four and a half or five times as long as its breadth at lower end; *frontal calli* black or blackish brown, lower callus large, shining, quadrate, only separated from eye on each side by narrowest possible pollinose interval, its lower margin straight and not descending below level of inner angles of eyes, upper frontal callus less shining and less convex, not connected with lower and, when completely denuded, sharply defined and more or less scutiform; *eyes of ♀ in life* bronze-green, without bands; *palpi* cream-coloured, proximal segment clothed with hair like that on jowls, distal segment in ♀ sharply acuminate, strongly swollen at base as seen from side, clothed on outer side with minute, appressed, silvery-white hairs, occasionally interspersed with a few minute, black hairs; first segment of *antennae* (see fig. 5a) tawny-olive, strongly swollen distally, with upper distal angle conspicuously produced and embracing second segment, first segment clothed with glistening cream-coloured or pale Naples-yellow hairs (on lower distal angle and under surface with longer whitish hairs); second segment of antennae

ochraceous-tawny, small, with its upper distal angle strongly produced; third segment of antennae ochraceous-tawny or orange-cinnamon-coloured, annulate portion sometimes brown or brownish, equal in length to about three-fourths of expanded portion, latter in ♀ fairly deep a little before middle, and with a blunt, rounded angle on upper margin. *Thorax*: dorsum (including scutellum) smoke-grey pollinose, clothed with fine, short, silky, appressed drab-coloured hair (in certain places, as on fore-border of scutum, lateral borders of scutellum, and in region of admedian, longitudinal thoracic stripes seen in many species of *Tabanus*, replaced by paler hair), hair immediately above base of wing and on anterior extremity of postalar callus on each side longer and whitish; ante-alar tubercle on each side vinaceous buff, clothed with whitish or yellowish hair, intermixed below with fine and fairly long black hairs; pleurae and pectus pale neutral grey pollinose, clothed with fine whitish hair. *Abdomen*: second (visible) and three (or four) following tergites each with a pair of admedian, elongate, slightly oblique blackish-brown

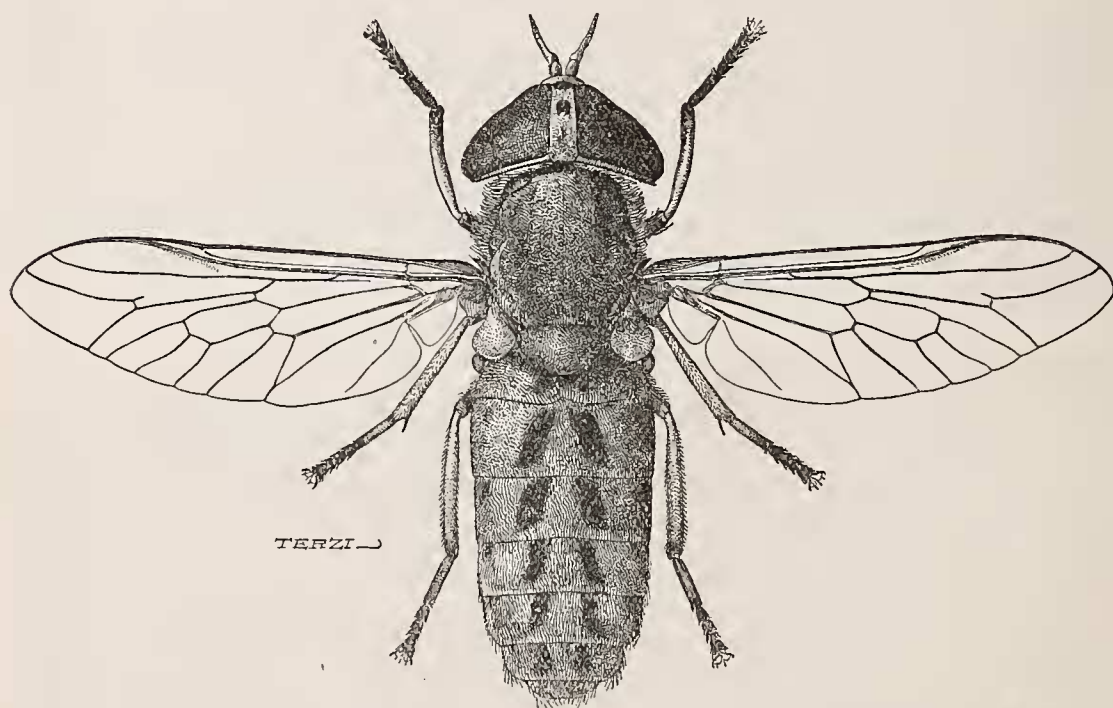


Fig. 4. *Tabanus fumidus*, Austen, ♀.

marks, as seen in fig. 4, resting on front margin in each case but not reaching hind border, second and two (or three) following tergites also each with a small, oblique, more or less distinct blackish-brown fleck near each lateral extremity of the fore border, and near or resting upon anterior margin in each case; ground-colour of sides of second and third, or second, third and fourth tergites sometimes vinaceous buff; lateral extremities of first (visible) tergite clothed with fine whitish hair of moderate length, lateral extremities of five following tergites clothed with silvery white hair, short and appressed in case of second and third, longer on the lateral margins of the other three tergites, dark markings clothed, at least in part, with minute, appressed black or blackish-brown hairs, hind border of terminal segment fringed with fairly long, fine black hairs, sometimes mixed with pale hairs, dorsum clothed elsewhere with minute, appressed, pale olive-buff or ivory-yellow hairs; ventral surface of first three or four (visible) segments uniformly smoke-grey pollinose, two following sternites, except hind margins, usually darker (mouse-grey), ventral surface of first



six segments clothed with minute, appressed, glistening whitish or silvery white hairs, in case of sixth sternite sometimes interspersed with longer blackish hairs, ground-colour of hind margins of second to fifth sternites inclusive ivory-yellow, hind margin of sixth sternite cream-coloured, hind margins of fourth and two following sternites clothed with longer whitish hair, seventh sternite deep mouse-grey or dark mouse-grey, clothed with usual coarse, erect, black hair. *Wings*: costa mummy-brown, other veins tawny olive or light sepia-coloured; *stigma* colourless, scarcely distinguishable. *Squamæ* pale pinkish-buff, fringed with fine whitish hair. *Halteres* pale ochraceous-buff, knobs sometimes light buff or ivory-yellow. *Legs*: coxae pale neutral-grey pollinose, clothed with fine whitish or silvery white hair; femora, except tips which are cinnamon-buff, neutral grey pollinose, clothed with silvery white hair, middle femora sometimes entirely or mainly cinnamon-buff pollinose, mottled with neutral grey; tibiae cream-coloured or cream-buff (distal thirds or rather less than distal halves of front pair blackish-brown or black), clothed with short silvery white hairs, extreme tips of middle and hind pairs, or at any rate of latter, brownish, at least on inner side; front tarsi blackish-brown or black, not noticeably expanded or fourth segment very slightly so; middle and hind tarsi mummy-brown and clothed above with minute black hairs, first segment in each case, except tip, more or less cream- or cinnamon-buff-coloured, and clothed above, at least in part, except distal extremity, with minute, appressed, silvery white hairs; hind tarsi, except tips of first four segments, sometimes cinnamon-buff, second and following segments of middle tarsi distinctly expanded.

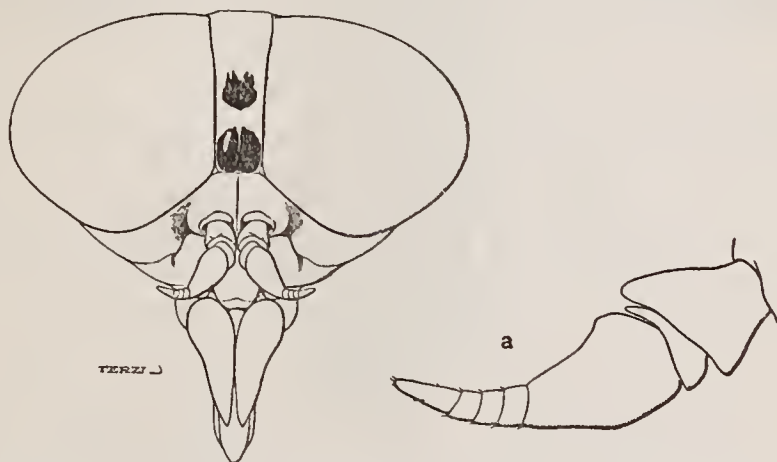


Fig. 5. Head of *Tabanus fumidus*, Austen, ♀, from in front; a, antenna, from the side.

Hit and Anah, R. Euphrates (*Major A. D. Fraser*). Holotype, Hit, 28.vii.1920; two paratypes, Anah, 4.viii.1920, "flying round lamp at night."

In the ♀ sex, at any rate, the species described above superficially somewhat resembles *Tabanus pulverifer*, Walk. (see below), the typical series of which was obtained seventy-two years ago at Baghdad (*W. K. Loftus*). From the ♀ of its congener in question that of *T. fumidus* is, however, distinguishable, *inter alia*, by the front being, on the whole, somewhat narrower; by the upper frontal callus being more concentrated and more sharply defined; by the eyes being unbanded; by the upper distal angle of the first segment of the antenna not being dark brown; by the smoke-grey median triangle on the dorsum of each abdominal segment, from the second (visible) to the fifth inclusive, being broader and anteriorly more bluntly truncated; by the appendix to the anterior branch of the third longitudinal vein being longer; and by the middle and hind femora not being entirely pale (pinkish buff).

The ♀ of *Tabanus fumidus* likewise somewhat resembles that of *T. accensus*, Austen (Bull. Ent. Res., x, pt. 3, p. 309, figs. 11, 12, April 1920), from which, on the other hand, it may be distinguished at once by the absence of eye-bands and of definite thoracic stripes, and by the presence of an appendix to the anterior branch of the third longitudinal vein.

From the ♀ of *T. pallidipes*, Austen (*ibid.*, p. 316, figs. 15, 16)—a species which, like *T. accensus*, Austen, has as yet been met with only in Palestine—that of *fumidus* is distinguishable forthwith by its much broader front.

### **Tabanus glaber, Big.**

One ♂, precise locality unknown, 1917 (Dr. A. Balfour, C.B., C.M.G.) ; three ♀♀, Nasiryeh, R. Euphrates, September–October 1916, “biting camel” (Major W. S. Patton, I.M.S.) ; one ♀, Amara, R. Tigris, 22.x.1918, “on bullocks,” and fourteen ♀♀, same locality, 27.x.1918 (P. A. Buxton—presented by the Imperial Bureau of Entomology).

The type of this species (*ex coll.* J. Bigot ; *ex coll.* G. H. Verrall), which, it may be noted, is from Afghanistan and not (as stated by Kertész, Cat. Dipt., iii, p. 246, 1908) from “India or.”, is now in the National Collection. The latter also contains a series of ♀♀ of *T. glaber* from Pad-i-Sultan, Helmund R., Afghanistan, 1884–85 (Dr. J. E. T. Aitchison), and a further example of the same sex from Kashgar, Eastern Turkestan, 13.viii.1888 (Dr. Lansdell).

In the Helmund Valley, Afghanistan, according to Dr. Aitchison (Trans. Linn. Soc., Lond. (2) v, Zool., p. 131, 1889), *T. glaber* bites horses severely.

### **Tabanus inaequatus, sp. n. (figs. 6, 7).**

♀.—Length (four specimens), 12 to 13.6 mm. ; width of head, 4 to 4.4 mm. ; width of front at vertex, 0.4 to just over 0.5 mm. ; length of wing, 10.5 to 11.4 mm.

*Small species, with, in ♀, rather narrow front, two frontal calli, bare eyes marked with three purple bands, unicolorous, dark olive-grey, unstriped thorax, and ochraceous-tawny, cinnamon- or light cinnamon-coloured abdomen, with infuscated apex and more or less distinct, sometimes sharply defined, sometimes greatly attenuated and widely interrupted, narrow, dark, median, dorsal longitudinal stripe.*

*Head*: front dark olive-buff pollinose, clothed with minute, appressed, Naples-yellow hairs, sometimes interspersed in vicinity of vertex with a few minute black hairs ; only a slight indication of an ocellar tubercle, but *anterior ocellus distinctly visible* (at least in typical series—see fig. 7a) ; subcallus olive-buff or pale olive-buff pollinose ; face and jowls pale smoke-grey pollinose, clothed with whitish or yellowish-white hair ; occiput light olive-grey pollinose, clothed below with whitish hair, hind margin of occiput fringed above with short, yellowish hair ; *front* in ♀ of uniform or nearly uniform width, about five and a half times as long as its breadth at lower end ; *lower frontal callus* mummy-brown or blackish brown, large, narrowly separated from eye on each side, roughly quadrate in outline, its lower margin straight and not descending below level of inner angles of eyes, upper angles more or less rounded off, upper margin somewhat irregular and sometimes decidedly shorter than lower ; *upper frontal callus* black, elongate, fusiform, connected with or narrowly separated from lower callus ; *palpi* in ♀ cream-buff or cream-coloured, proximal segment clothed with yellowish or yellowish-white hair, distal segment elongate, tapering to a blunt point or acuminate, not greatly swollen proximally as seen from side, clothed on outer surface with minute, appressed, Naples-yellow or cream-coloured hairs, mixed with a larger or smaller number of minute black hairs ; first and second segments of *antennae* in ♀ (fig. 7b) cinnamon-buff, first segment more or less expanded distally, and partly embracing second segment, clothed on upper surface, or at least on upper distal angle, sometimes also on entire distal extremity, with minute black hairs,



first segment clothed otherwise with cream-coloured hairs; upper distal angle of second segment of antennae slightly or only moderately produced, distal margin of second segment clothed with minute black hairs; expanded portion of third segment of antennae tawny or orange-cinnamon-coloured (sometimes brownish towards distal extremity), of moderate depth proximally, and with a blunt or rounded angle on upper margin shortly before middle, annulate portion of third segment blackish brown, elongate, approximately as long as expanded portion. *Thorax*: dorsum, including scutellum, clothed with minute, appressed, glistening Naples-yellow hairs, postalar calli clothed beneath with longer yellowish-white hairs; ante-alar tubercles cinnamon-buff, clothed above with silky, glistening Naples-yellow hair, mixed with some erect black hairs, and below with longer, outstanding black hairs; pleurae and pectus smoke-grey pollinose, clothed with fine, silky, whitish or yellowish-white hair, mixed on upper portion of mesopleurae with a certain number of fine black hairs. *Abdomen*: dorsum marked as shown in fig. 6, but dark neutral grey, median, longitudinal stripe, which commences at base of second (visible) segment, is often more or less distinctly

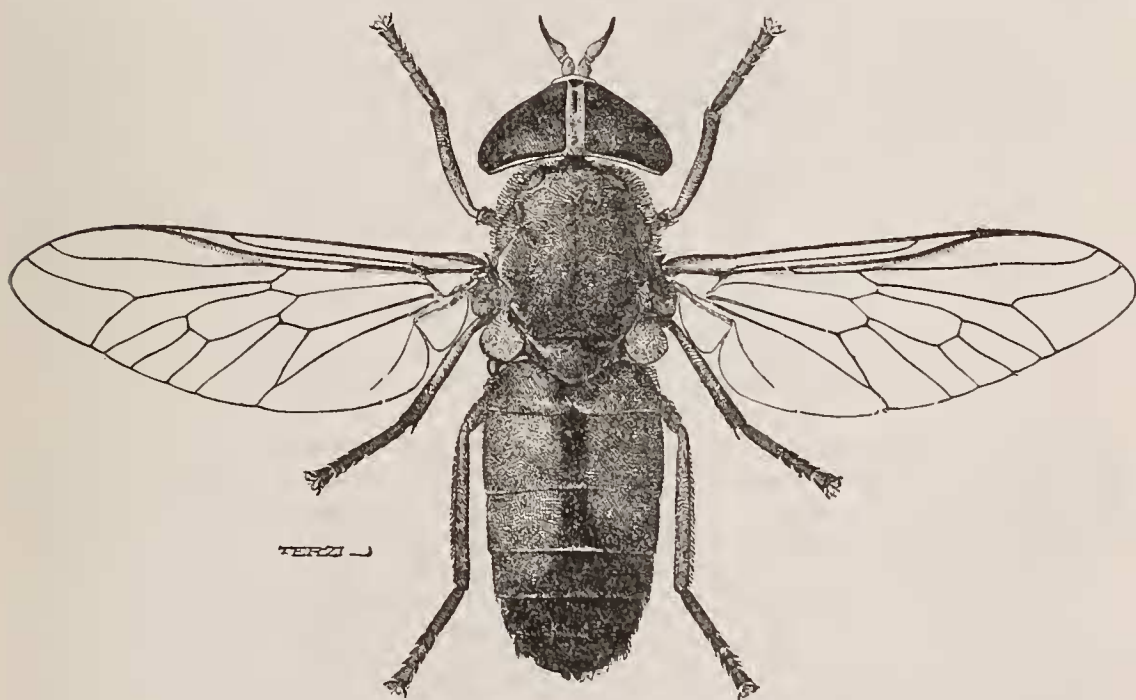


Fig. 6. *Tabanus inaequatus*, Austen, ♀.

and widely interrupted on hind borders of second to fourth tergites inclusive (at least as seen when viewed at a low angle from behind), and is sometimes much narrower; first (visible) tergite with a pair of admedian, dark neutral grey spots, in contact with one another or narrowly separated in middle line, lying on each side of tip of scutellum or just beyond it, and widely separated from hind margin of segment; hind margins of second and following tergites, except last, more or less distinctly light greyish-olive pollinose; last two or last three tergites mainly dark neutral grey, that is, with exception of lateral extremities and hind margins in case of fifth and sixth tergites, and with exception of lateral extremities in that of seventh, although fifth tergite, even when its infuscation is not confined to median stripe, often shows a large, ill-defined, paler (more or less ochraceous-tawny) blotch on each side of region of latter; first six (visible) tergites clothed partly with minute, appressed, glistening Naples-yellow hairs, which, *inter alia*, form a more or less distinct pale longitudinal stripe down centre of median dark stripe, partly with minute black hairs, latter of which are situated especially on each side of median dark stripe on second and third or second to

fourth segments inclusive ; seventh tergite clothed mainly with longer fine black hairs, similar hairs, interspersed with longer fine pale hairs, being usually present on lateral extremities and posterior angles of the three preceding segments ; ventral surface of first five or first six (visible) segments cinnamon- or pinkish-cinnamon-coloured, without slightest trace of a dark median longitudinal stripe, hind margins of second to sixth sternites inclusive pale (cream-coloured or pale pinkish-buff), sixth sternite, except lateral extremities and hind margin or hind border, often mouse-grey or deep mouse-grey, seventh sternite dark mouse-grey or blackish mouse-grey, clothed with usual coarse, erect, black hair, remainder of venter clothed with minute, appressed, glistening, Naples-yellow or cream-coloured hairs, which on sixth sternite are largely intermixed with longer black hairs, a certain number of black hairs also often present on fifth sternite. *Wings* with a distinct light drab or brownish tinge ; veins light sepia-coloured or tawny-olive, anterior branch of third longitudinal vein without an

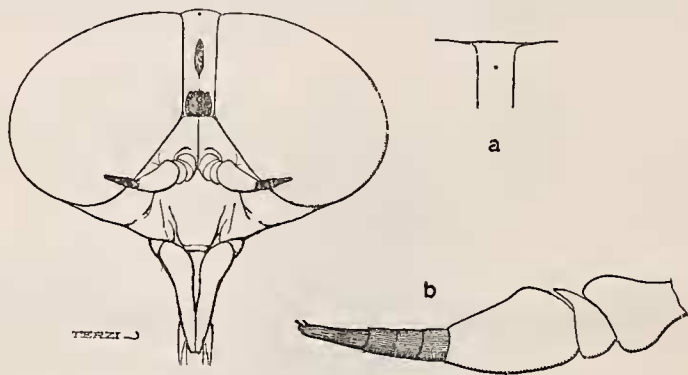


Fig. 7. Head of *Tabanus inaequatus*, Austen, ♀, from in front ; a, anterior ocellus ; b, antenna from the side.

appendix ; *stigma* colourless, inconspicuous. *Squamae* pinkish-buff, their borders light cinnamon-buff. *Halteres* : stalks cinnamon-buff, knobs pale pinkish-buff or ivory-yellow. *Legs*, except tarsi, ochraceous-tawny or cinnamon-coloured, front tibiae brownish towards distal extremities, extreme tips of hind tibiae also sometimes brownish on inner side ; front tarsi mummy-brown, not expanded, middle and hind tarsi cinnamon-brown, in case of hind tarsi first segment and extreme bases of following segments sometimes paler (ochraceous-tawny) ; tarsi clothed with minute black hairs ; distal extremities and upper surfaces of femora, infuscated area of front tibiae, and distal extremities and extensor surfaces (at least in part) of middle and hind tibiae, as also flexor surface in case of hind tibiae to a greater or less extent, clothed, at least in part, with similar hair ; legs otherwise clothed with pale (light buff or cream-buff) hair, longer and finer on coxae and lower sides of femora, as also on outer edge of extensor surface in case of hind tibiae, elsewhere for most part short, appressed and glistening.

Amara and vicinity, 18.vii.1918 (*P. A. Buxton*).

Owing especially to the ochraceous-tawny or cinnamon-coloured areas on each side of the dorsum of the abdomen being unicolorous, *i.e.*, devoid in each case of a longitudinal series of greyish pollinose or pale-haired oblique blotches, the species described above cannot, in the ♀ sex at least, be confused with any of its congeners known to the writer. As regards other characters, although presenting a certain superficial resemblance in coloration to *Tabanus acuminatus*, Lw., which is found in Southern and Central Europe and in Siberia, the ♀ of *T. inaequatus*, apart from the apex of its abdomen not being laterally compressed, is at once distinguishable from that of the species mentioned by its bare eyes, much narrower front, much more attenuated dorsal abdominal stripe, and pale femora.